

WHAT IS CLAIMED IS:

a ~~1. A vaccinia virus modified by the presence of exogenous DNA in the vaccinia genome.~~

~~2. A vaccinia virus as in Claim 1 wherein said exogenous DNA is expressed in a host by the production of a protein.~~

~~3. A vaccinia virus as in Claim 2 wherein said protein is an antigen.~~

~~4. A vaccinia virus as in Claim 2 wherein said exogenous DNA is a gene of herpes simplex expressed in a host by the production of thymidine kinase.~~

~~5. A vaccinia virus as in Claim 4 wherein said virus is free of vaccinia gene producing thymidine kinase.~~

~~6. A vaccinia virus as in Claim 3 wherein said antigen is influenza virus hemmagglutinin.~~

~~7. A vaccinia virus as in Claim 3 wherein said antigen is hepatitis B surface antigen.~~

~~8. A vaccinia virus as in Claim 3 wherein said antigen is herpes simplex virus glycoprotein D.~~

~~9. A vaccinia virus as in Claim 1 which is vaccinia virus VP-2, VP-3, VP-4, VP-5, VP-6, VP-7, VP-8,~~

VP-9, VP-10, VP-11, VP-12, VP-13, VP-14, VP-16, VP-17,
VP-18, VP-22, VP-53, VP-59, or VP-60.

10. The method of replicating DNA in a eukaryotic cell by infecting said cell with a vaccinia virus modified to contain said DNA, said DNA being exogenous to said vaccinia virus.

11. A method as in Claim 10 wherein said DNA is also exogenous to said cell.

12. A method as in Claim 11 wherein said DNA is expressed by said cell.

13. A method as in Claim 12 wherein said DNA is expressed by the production by said cell of a biological product.

14. A method as in Claim 13 wherein said DNA which is replicated includes the herpes simplex TK gene and said biological product is thymidine kinase.

15. A method as in Claim 13 wherein said DNA which is replicated includes the influenza hemmagglutinin gene and said biological product is the influenza hemmagglutinin antigen.

16. A method as in Claim 13 wherein said DNA which is replicated includes the HBsAg gene and said biological product is the hepatitis B surface antigen.

17. A method as in Claim 13 wherein said DNA which is replicated includes the gene for HSVgD and said biological product is the herpes simplex virus glycoprotein D.

18. The method of immunizing a host animal, susceptible to vaccinia virus, by inducing said animal to develop antibodies against an antigen, which method comprises inoculating said host animal with a vaccinia virus having, within the vaccinia genome, DNA exogenous to said genome and coding for said antigen.

19. A method as in Claim 18 wherein said vaccinia virus contains DNA coding for influenza virus hemagglutinin.

20. A method as in Claim 18 wherein said vaccinia virus contains DNA coding for hepatitis B surface antigen.

21. A method as in Claim 18 wherein said vaccinia virus contains DNA coding for herpes simplex glycoprotein D.

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